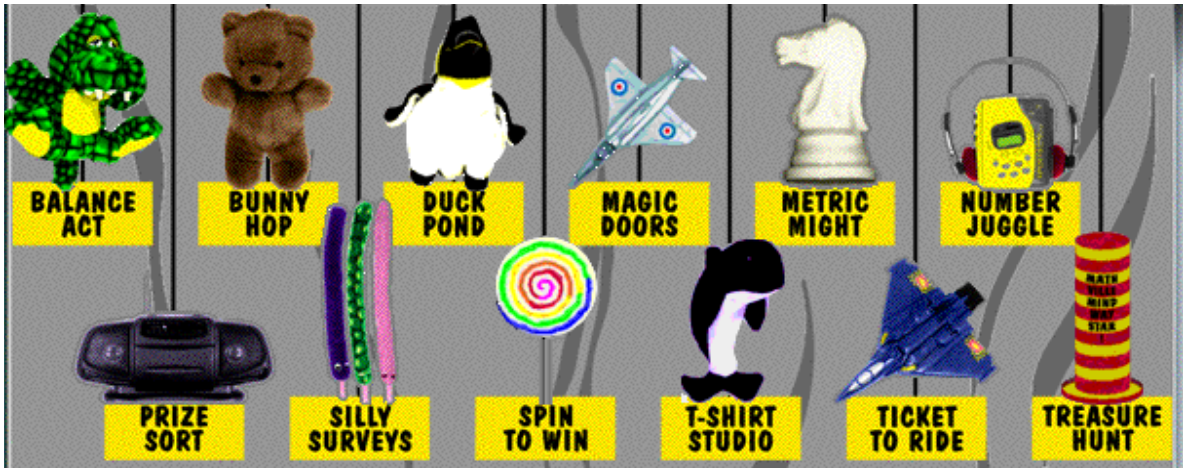
Mathville Midway



Teacher Guide

Courseware Solutions Inc.
www.mathville.com

Mathville Mindway

Mathville™ Mindway
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Getting started

Insert the CD-ROM into the CD-ROM drive.

Windows 3.x

a) Using the File Manager, click the CD-ROM drive icon.

b) Double-click **mindway.exe** to start.

Windows 95

a) Choose My Computer.

b) Choose the CD-ROM drive icon.

c) Double-click the **Mindway** icon to start.

Macintosh

a) Double-click the **Mathville Mindway CD** icon to show the contents of the CD-ROM.

b) Double-click the **Mindway** icon to start.

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Overview

Mathville Mindway is part of the **Mathville™** series of educational software, which is based upon the belief that EVERY student can enjoy developing and demonstrating their mathematical literacy within a supportive, mathematically rich environment.

The **Mathville** series is used in thousands of schools and is recommended by many departments and boards of education. The programs are designed in accordance with the standards developed by the National Council of Teachers of Mathematics and adhere to the curriculum guidelines of many North American educational jurisdictions.

Structure & content

Mindway is a midway-themed environment where students can discover a wide variety of highly motivating math activities. It is a non-linear, non-hierarchical program, and students are free to start or leave any of the activities at any time. Each of the twelve activities requires the student to use specific math and problem-solving skills. The skills required are listed in the table on pages 4 and 5.

Suggested grade range

The topics in **Mindway** are often introduced in grade 4 classrooms. Due to its structure, which allows students to freely explore a wide variety of activities and math skills, the program may be used in grades 3 to 5 and may be enjoyed by younger or older students as well.

Recommendations for use

Most students readily begin exploring **Mindway** on their own, require little supervision and enjoy playing for a full class period or more. The program is designed to be used independently by students and does not require close

adult supervision. Careful observation of a student's interactions with the program can reveal a great deal to the teacher about a student's problem-solving abilities, understanding of concepts and ability to apply skills in new situations.

Mindway may be used as:

- a highly motivating way to reinforce and provide additional practice in math skills introduced in class
- a means of providing a wider variety of applications of math skills and concepts
- a source of assessment information about a student's problem-solving methods and styles and a diagnostic tool to determine areas of difficulty (See **Assessment**, page 20)
- an enrichment activity for students who excel in math

Having pairs of students use the program works well, creating a setting which encourages the development of communication skills and co-operative problem solving.

Tracking student progress

Each **Mindway** activity includes an optional printable record of achievement which includes a list of the learning outcomes associated with each activity. These certificates provide a "paper track" of individual student progress and are also excellent additions to a student's math portfolio. Records of achievement printed out over time can be used to measure improvement and provide evidence of skills mastery. A summary of a student's session results can be printed out by clicking the **RESULTS** button on the Mindway main screen.

Electronic manual

An electronic version of this manual is included on the CD-ROM for reference and as a backup. It may be printed in whole or in part. To use the electronic version, double-click its icon.

System Requirements

Mindway is a dual-platform multimedia CD-ROM program that runs on a Windows PC or a Macintosh with the following minimum requirements:

Multimedia PC

- 486 or Pentium
- 8 MB RAM
- Windows 3.x or 95
- SVGA 640 x 480, 256-color monitor
- CD-ROM drive
- Sound card
- Printer recommended

Macintosh

- System 7
- 8 MB RAM
- 640 x 480 color monitor
- CD-ROM drive
- Printer recommended

Copying to a hard drive

Mindway was developed to run directly from the CD-ROM. However, if you wish to copy it to a hard drive and run it, the following files and folders, which require about 35 MB, should be copied:

Windows 95

- **Mindway.exe**
- DATA folder

Windows 3.x

- **Mindway.exe**
- DATA folder/directory

Macintosh

- **Mindway**
- DATA folder

Curriculum Connections

Number Sense & Numeration

Addition	Duck Pond, Balance Act
Counting by 3's, 4's, 5's, 6's, 7's, 8's, 9's, & 10's	Magic Doors
Decimals (comparing and ordering)	Number Juggle
Decimals (concepts)	Spin to Win, Ticket to Ride
Decimals (recognizing and reading)	Number Juggle, Spin to Win, Ticket to Ride
Divisibility	Prize Sort
Division	Duck Pond
Estimation	Balance Act, Magic Doors
Fractions (comparing)	Silly Surveys
Fractions (concept)	Silly Surveys, Spin to Win, T-shirt Studio
Mental math	Duck Pond, Balance Act, Magic Doors
Multiplication	Duck Pond, Magic Doors
Number facts	Duck Pond
Place value (whole numbers and decimals)	Number Juggle, Ticket to Ride
Subtraction	Duck Pond, Balance Act
Whole numbers (comparing and ordering)	Number Juggle

Geometry and Spatial Sense

Congruence	T-shirt Studio
Coordinates	Treasure Hunt
Flips	T-shirt Studio
Navigating a grid	Treasure Hunt
Polygons (identify, sort, classify)	Treasure Hunt, T-shirt Studio
Polyhedra (identifying faces of)	Treasure Hunt
Symmetry	T-shirt Studio
Three-dimensional figures	Treasure Hunt

Two-dimensional figures . . . . . .Treasure Hunt, T-shirt Studio
Turns . . . . . .T-shirt Studio

Measurement

Estimating lengths and masses . . . . . .Metric Might
Length (selecting appropriate units) . . . . . .Metric Might
Mass (measuring, estimating, comparing) . . . . . .Balance Act, Metric Might
Metric units (relations between, prefixes) . . . . . .Metric Might
Perimeter & area (selecting appropriate units) . . . . . .Metric Might

Patterns & Relations

Deducing attributes from sorting patterns . . . . . .Prize Sort
Equivalence using concrete representation . . . . . .Balance Act
Inequalities . . . . . .Prize Sort
Missing terms in simple equations . . . . . .Duck Pond
Numerical & non-numerical patterns . . . . . .Bunny Hop, Magic Doors
Patterning strategies . . . . . .Magic Doors
Relating numerical & geometric patterns . . . . . .Magic Doors
Sorting by attributes . . . . . .Prize Sort
Venn diagrams . . . . . .Prize Sort

Data Management & Probability

Bar graphs . . . . . .Spin to Win
Chance . . . . . .Spin to Win
Conduct surveys . . . . . .Silly Surveys
Record and tally data from a survey . . . . . .Silly Surveys
Predicting results . . . . . .Spin to Win
Probability concepts & vocabulary . . . . . .Spin to Win

Problem Solving

Throughout the program, but especially in:
Bunny Hop, Magic Doors, Prize Sort, Treasure Hunt

Quick Tour

- To select a **Mindway** activity, click its name.
- To return to this main screen, click the **Back to Mindway** button in each activity.
- The seven rectangular buttons in the upper left corner of the screen are:
  - **QUIT** – to exit from the program **Mindway**
  - **HELP** – to hear context-sensitive help
  - **CREDITS** – to see a list of the creators of **Mindway** along with telephone, fax and e-mail information
  - **SOUND** – to display the control that adjusts the sound volume

    - **TOPICS** – to display the curriculum connections chart and a list of the learning outcomes for each activity.
    - **PRINT** – to print the Mindway main screen.
    - **RESULTS** – to display a printable summary of the results of the activities accessed during the session.
- Starting the program is a straightforward process that most computer-literate students could handle on their own, perhaps following a teacher demonstration or the posted "Getting started" instructions (see the first page of this manual). Since the program runs straight from the CD-ROM, there is no danger of causing accidental damage to the program or any other program on the computer.
- When done with the program click **QUIT** and eject the CD-ROM. There is no need to "uninstall" since nothing is ever put on the hard drive.
- Students generally discover a lot about **Mindway** by following their natural inclinations to explore. Encourage students to answer their own "What do I do next?" or "How do I…"-type questions by using the **HELP** button or looking at the screen and experimenting.
- Having pairs of students work together on the program works well, providing a setting for cooperative problem-solving. One way of doing this is to set up a computer running **Mindway** in a resource or math lab area.
- Asking students to explain and compare the strategies they used for activities such as **Bunny Hop** or **Magic Doors** provides an opportunity to assess both communication and problem-solving skills.
- If a printer is available, you may wish to ask students to click the **RESULTS** button or the **PRINT** button that appears when each activity is completed and to save the printouts as a way of tracking their achievements in the program.
- Sample screens and more detailed descriptions of the math skills addressed in each activity begin on the next page.

Balance Act

Math skills

Estimate and compare mass using standard units

Demonstrate the meaning of equality by balancing objects

Add and subtract numbers mentally

Construct objects equal to a given mass

Solve problems involving mass

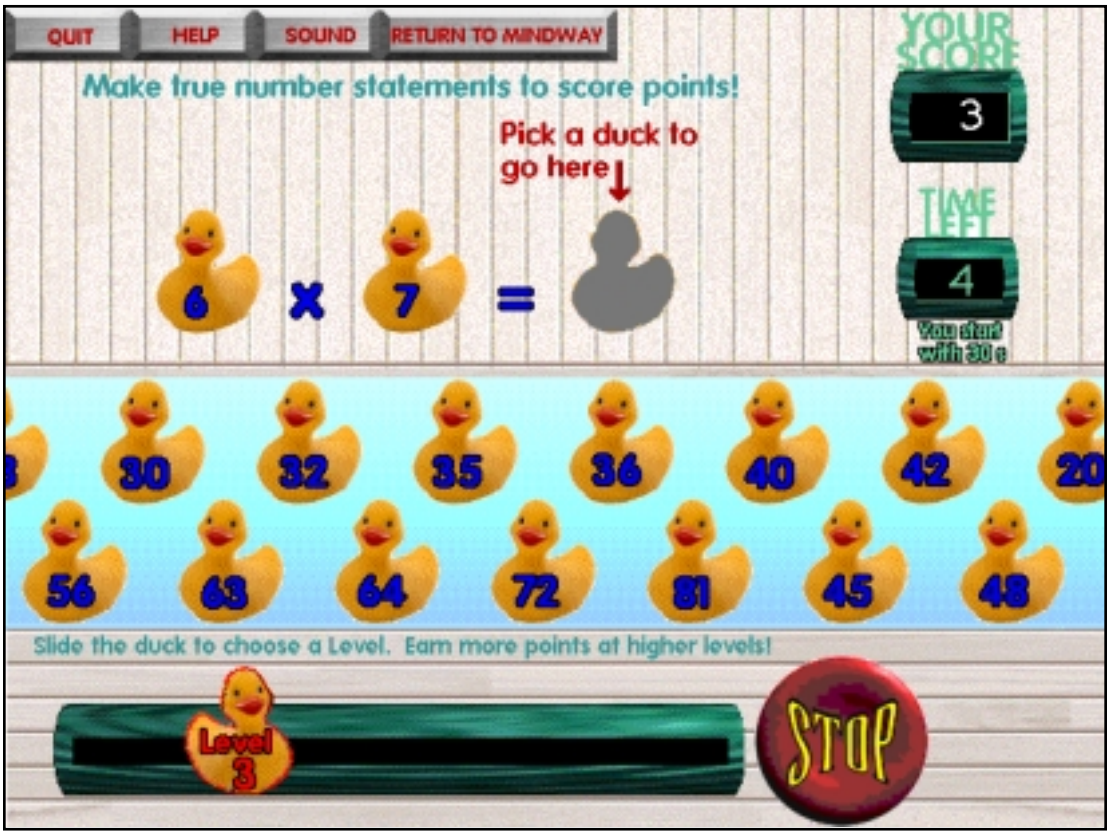
Bunny Hop

Math skills

Use pattern recognition as a strategy for problem solving

Identify numeric and non-numeric patterns

Duck Pond



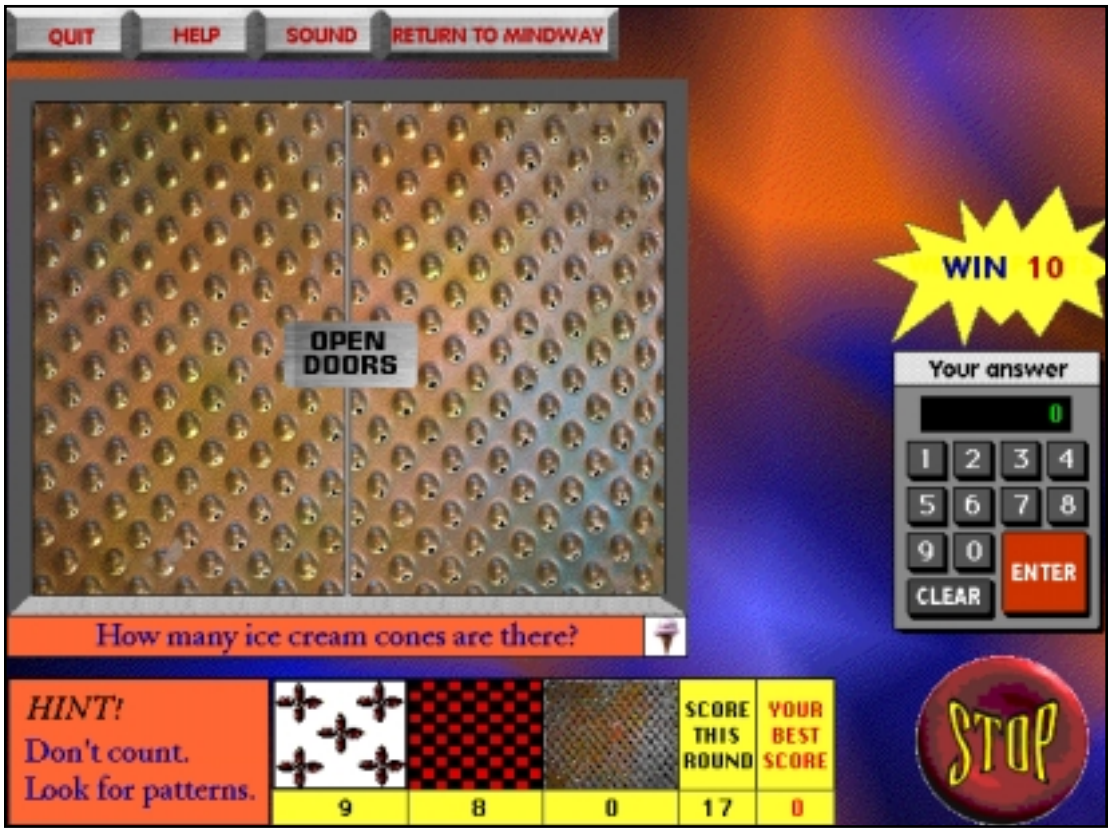
Math skills

Recall and apply addition, subtraction, multiplication and division number facts (multiplication and division facts to 81, addition and subtraction facts to 18)

Apply knowledge of number fact families to determine the missing term in a simple equation

Represent and describe numbers in a variety of ways

Magic Doors



Math skills

Make predictions using numeric and non-numeric patterns

Use estimation and patterning strategies to solve problems

Count by 2's, 3's, 4's, 5's, 6's, 7's, 8's, 9's and 10's to 100

Use diagrams/pictures to demonstrate the process of multiplication

Use mental arithmetic to solve problems

Metric Might

Math skills

Relate mm, cm, dm, m and km

Relate milligrams, grams and kilograms

Select appropriate units of mass, length, perimeter and area

Estimate lengths and masses

Number Juggle

Math skills

Compare and order whole numbers and decimals from 0.01 to 9999.99

Prize Sort

Math skills

Identify attributes and rules in presorted sets

Recognize if a number is divisible by another number

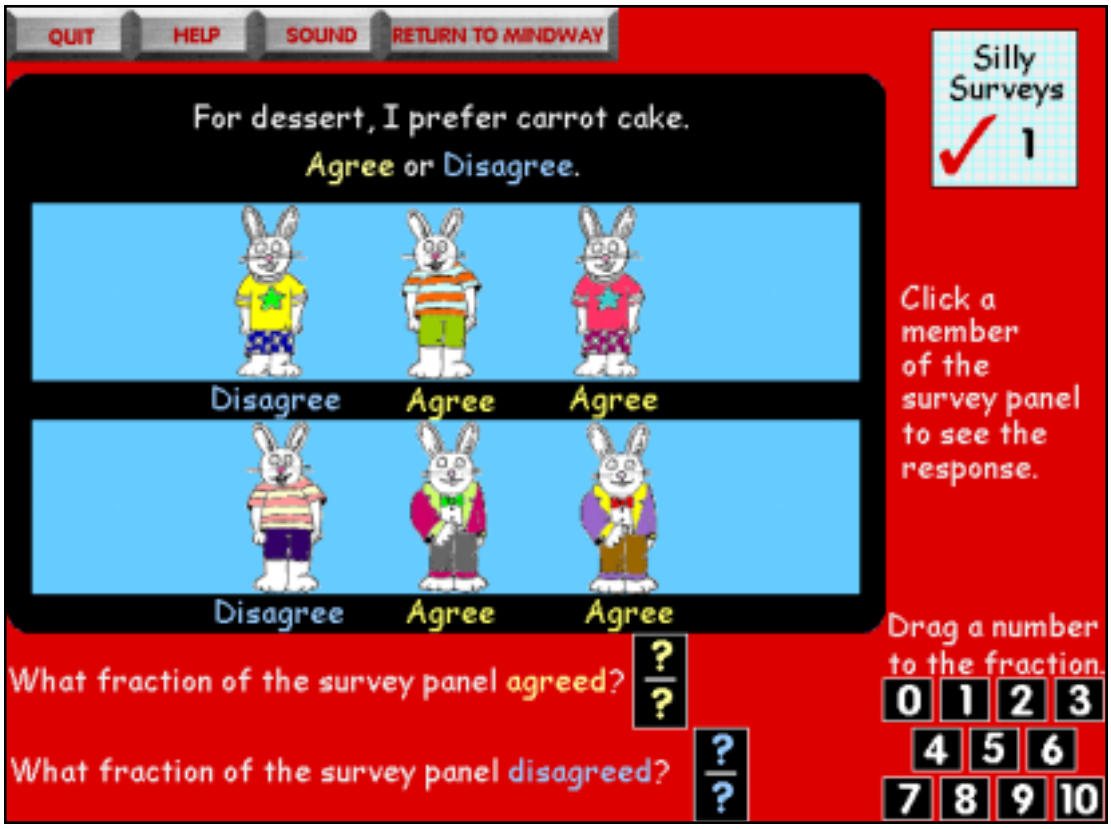
Recognize if a number is even or odd

Sort numbers into categories using two attributes of the numbers

Identify mathematical relationships using Venn diagrams

Recognize and use signs (<, >, ≤, ≥) in mathematical relationships

Silly Surveys

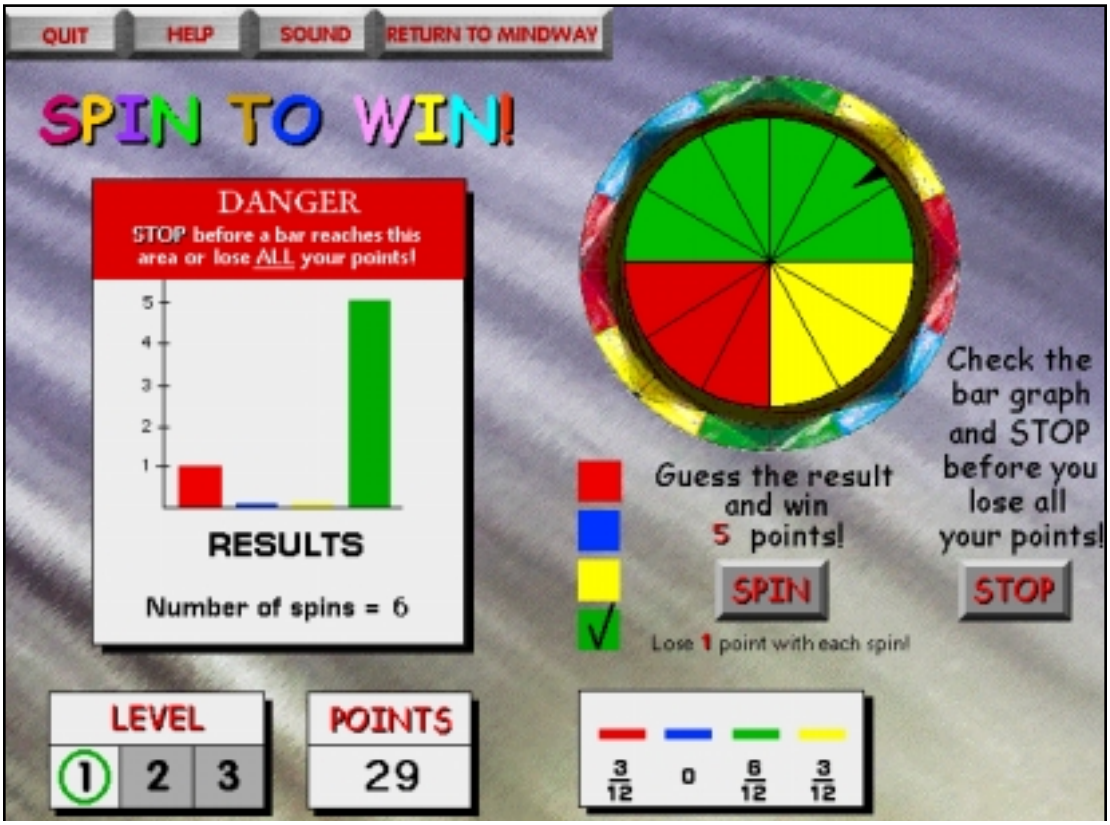


Math skills

Conduct surveys and record data

Represent and compare proper fractions with like denominators

Spin to Win



Math skills

Describe the likelihood of outcomes using such terms as more likely, less likely, chance

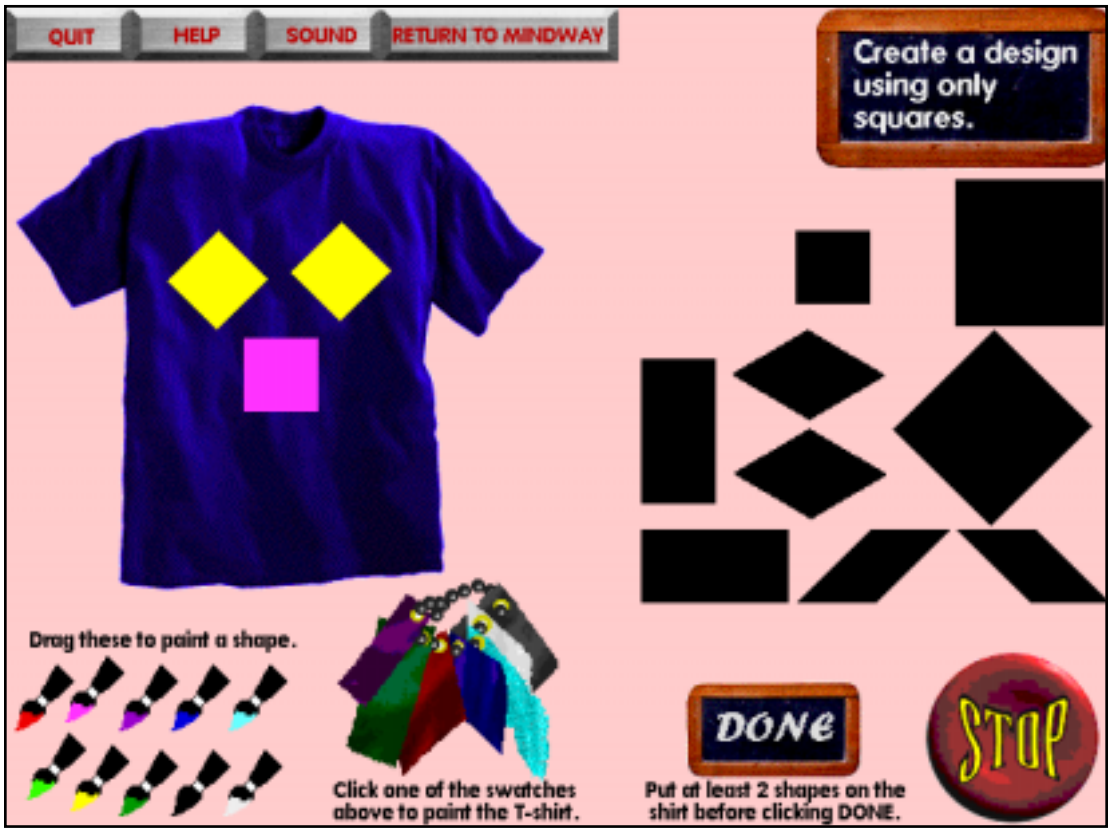
Illustrate common fractions as part of a region

Represent decimals (tenths) using concrete representation

Connect proper fractions with decimals (tenths)

Conduct probability experiments and predict results

T-shirt Studio


QUIT
HELP
SOUND
RETURN TO MINDWAY
Create a design using only squares.
Drag these to paint a shape.
Click one of the swatches above to paint the T-shirt.
DONE
Put at least 2 shapes on the shirt before clicking DONE.
STOP

Math skills

Create designs using slides, flips and turns

Illustrate common fractions as part of a set

Identify congruent shapes

Identify 2-dimensional shapes such as triangles and quadrilaterals

Recognize symmetrical shapes

Recognize parallel lines

Identify lines of symmetry

Ticket to Ride

Math skills

Recognize and read numbers from 0.01 to 9999.99

Represent the place value of whole numbers and decimals from 0.01 to 9999.99 using concrete materials and symbols

Treasure Hunt

Math skills

Identify and build 3-dimensional shapes

Recognize skeletons of 3-dimensional objects

Identify 2-dimensional shapes as faces of a solid

Describe and name pyramids and prisms by the base shape

Demonstrate an understanding of coordinate systems and grids

Assessment

Assessment data might be collected:

- to make decisions about instruction
- to monitor a student's progress
- for program evaluation
- for accountability
- to diagnose strengths and weaknesses

A variety of assessment tools may be used to collect data including:

- performance tasks
- observation
- interviews
- portfolios
- cooperative group activities
- projects
- written tests

Mathville Mindway, although primarily designed for reinforcement and motivational purposes, is well suited for use as a performance assessment task. Through observation and mini-interviews with students at the computer, teachers can determine levels of skill proficiency and areas of strength or weakness in order to make decisions about instructional needs. More

importantly, this type of performance assessment provides a holistic view of the student's mathematical ability, revealing communications and problem-solving skills as well as the student's ability to use mathematics and attitude towards mathematics.

In addition to this performance assessment, the achievement certificates which may be printed after successfully completing an activity can be used to track student progress and to provide evidence of skills mastery. They are also excellent additions to a math portfolio.

Mathville Mindway has been designed to challenge students with non-routine applications of skills, providing opportunities for students to use math in situations where skills must be combined or used in contexts other than familiar paper and pencil worksheets and drills. Nevertheless, teachers may find it useful to have a multiple choice and short answer test for diagnosing strengths and weaknesses in discrete skills and the application of those skills in routine ways. The following assessment items, covering the skills included in **Mathville Mindway** are provided for that purpose.

Paper and pencil items are presented starting on the next page and are linked in the Answer Key to corresponding activities in **Mathville Mindway**. These items may be copied, adapted and used in whole or in part to provide assessment data as described above.

Three of the **Mathville Mindway** activities (Bunny Hop, Magic Doors, Spin to Win) do not lend themselves to a multiple choice and short answer format and it is recommended that teachers use observation techniques and performance assessment strategies while the students interact directly with these on-line activities. As noted above, it is not intended that the items which follow be used to assess the higher order synthesizing and problem-solving skills addressed by **Mathville Mindway**.

Mindway Assessment Items

1. Write the measures:
   2500 kg 2000 kg 300 kg 200 kg 100 kg 100 kg
   in two columns so that the total in Column A =
   the total in Column B.

Column A	Column B

2. Fill in the blank. $\square - 4 = 4$

3. Fill in the blank. $5 \times 7 = \square$

4. Fill in the blank. $48 \div 8 = \square$

5. Fill in the blanks. $\square \times \square = 2$

6. Circle the smallest mass.

5 kg 5 g 5 mm 5 mg 5 cm

7. 0.1 m = ?

Circle the correct answer. 1 dm 1 cm 1 m

8. A door might be a little less than 1 ___ wide.

Circle the correct answer. square cm km m cm

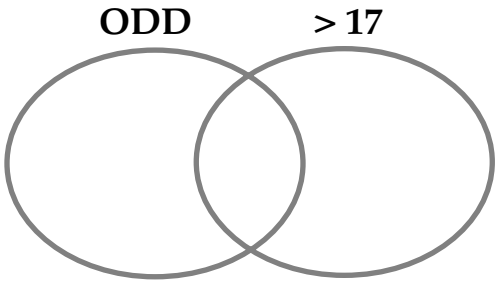
9. Write the numbers 0.7 1 0.2
in order from least to greatest.

10. Write the numbers 4403.93 4403.90 4403.31
in order from least to greatest.

11. Circle the numbers that are divisible by 4.

8 18 20 26 12 4 10 15

12. Write the numbers in the appropriate areas.



17 16

19 26

12 23

13. You asked **9** classmates the following survey question:

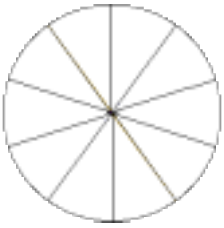
Mathville Mindway is a great learning program. Agree or Disagree.

The responses were: **Agree Agree Agree Disagree Agree Agree Agree Agree Agree**

What fraction of the survey group agreed?

What fraction of the survey group disagreed?

Which fraction is larger?

14. Shade 0.3 of the circle. 

15. Circle $\frac{6}{8}$ of the stars.

16. Circle the shape that is the letter L after a quarter turn.

17. Circle the shape that is the star ☆ flipped vertically.

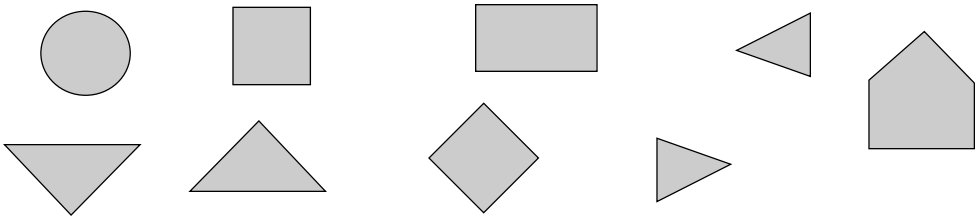
18. Circle all the letters that have exactly **1** line of symmetry.

A C H L O R

19. Circle the value that you need to add to **321.72** to make it **321.82**.

100 10 1 0.1 0.01

20. Circle all of the faces of a **rectangular pyramid**.



Assessment Key

1. **Balance Act**

Column A	Column B
2500	2000
100	300
	200
	100
2600	2600

2. 8 - 4 = 4 — **Duck Pond**, Level 2
3. 5 x 7 = 35 — **Duck Pond**, Level 3
4. 48 ÷ 8 = 6 — **Duck Pond**, Level 4
5. 2 x 1 = 2 — **Duck Pond**, Level 7

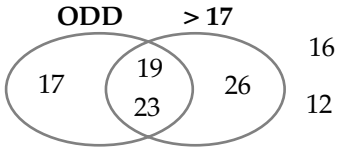
6. 5 mg — **Metric Might**
7. 1 dm — **Metric Might**
8. m — **Metric Might**

9. 0.2 0.7 1 — **Number Juggle**

10. 4403.31 4403.90 4403.93 — **Number Juggle**

11. 8 20 12 4 — **Prize Sort**

12. **Prize Sort**

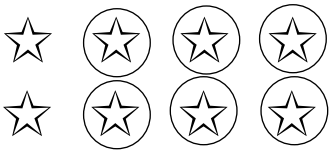


13. Agreed: $\frac{8}{9}$ Disagreed: $\frac{1}{9}$
* larger

Silly Surveys

14.

Spin to Win, (first part)

15. 

T-shirt Studio,
Fraction Paint

16.

T-shirt Studio, Turn T's

17.

T-shirt Studio, Flip T's

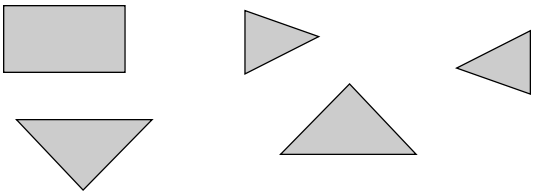
18. **A C**

T-shirt Studio, Shape Design

19. 0.1

Ticket to Ride

20. faces of a rectangular pyramid



Treasure Hunt

Troubleshooting – Macintosh

Problem	*Possible Cause*	*Possible Solution*
PERFORMANCE		
Program seems slow Program freezes	• not enough memory (at least 8 MB is required)	• Don't run other programs while running **Mindway** • Turn OFF background printing • Close all windows in the Finder
PRINTING		
Page doesn't print	• printer driver not installed or active • printer not properly connected • printer not selected under **Chooser**	• Refer to your printer and computer manuals
Printing is slow	• slow processor	• Don't use **Mindway** while the printing is processing

Troubleshooting – Windows

Problem	*Possible Cause*	*Possible Solution*
PERFORMANCE		
Program seems slow Program freezes	• not enough memory (at least 8 MB is required)	• Don't run other programs while running **Mindway**
General Protection Fault error	• memory management error	• Exit Windows and restart the computer • Run SCANDISK to detect and fix any memory location errors
Display is acting odd (fading, etc.) Some text on the screen seems too large	• monitor display may be set incorrectly	• Through Windows Setup, set your display to Super VGA 640 x 480, 256 colors • Choose small fonts instead of large fonts in display set up
PRINTING		
Page doesn't print	• printer driver not installed or active • printer not properly connected • printer not selected under Print Manager	• Refer to your printer and Windows manuals
Printing is slow	• slow processor	• Don't use **Mindway** while the printing is processing